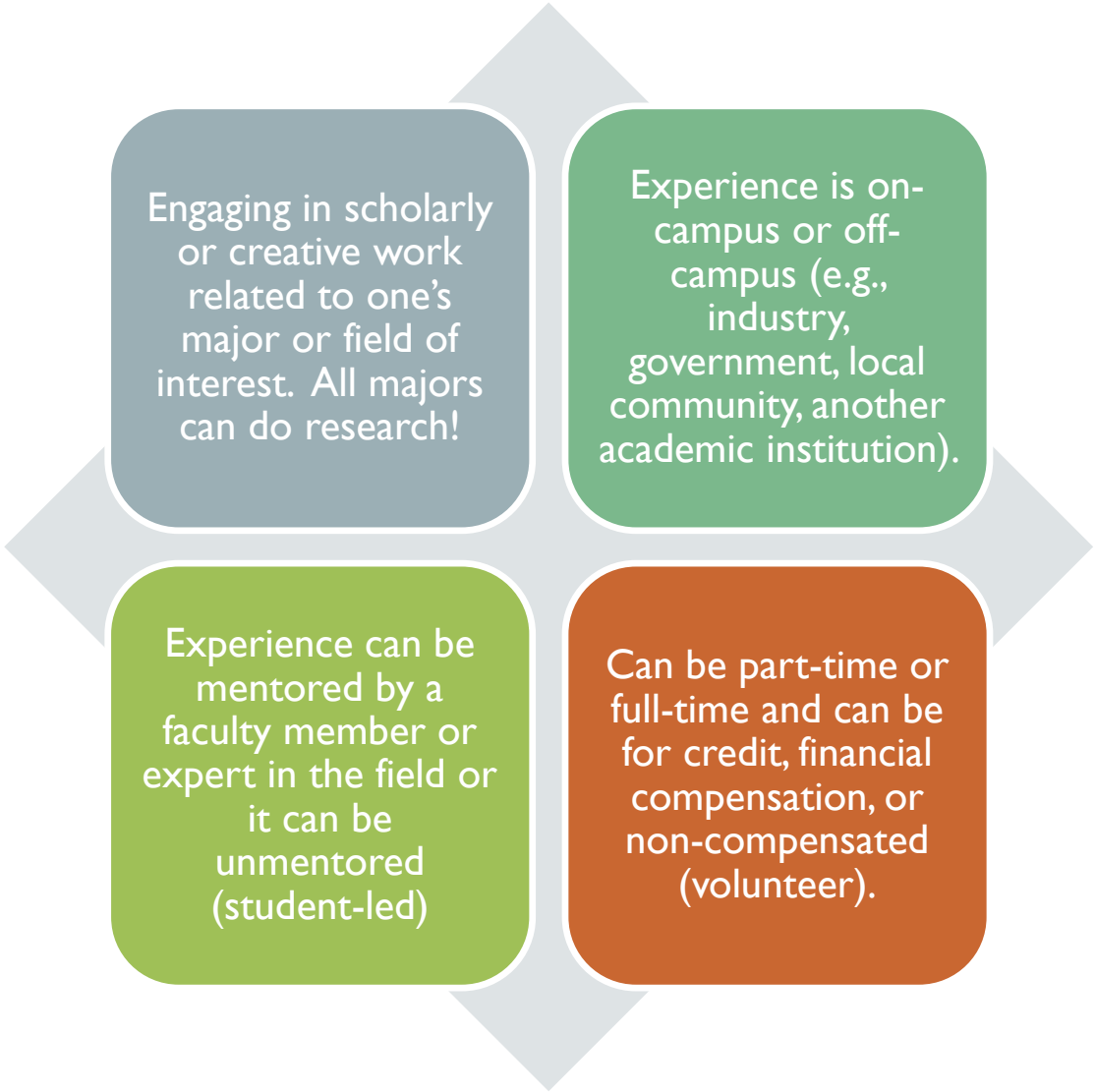
HOW TO GET STARTED IN UNDERGRADUATE RESEARCH

Dr. Laura Ott

UMBC Intern Success Conference

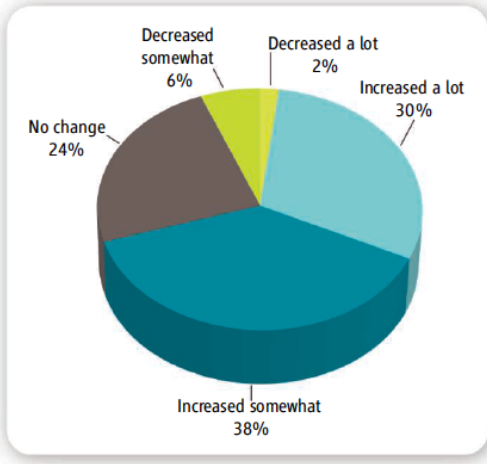
November 6, 2019

WHAT IS UNDERGRADUATE RESEARCH?



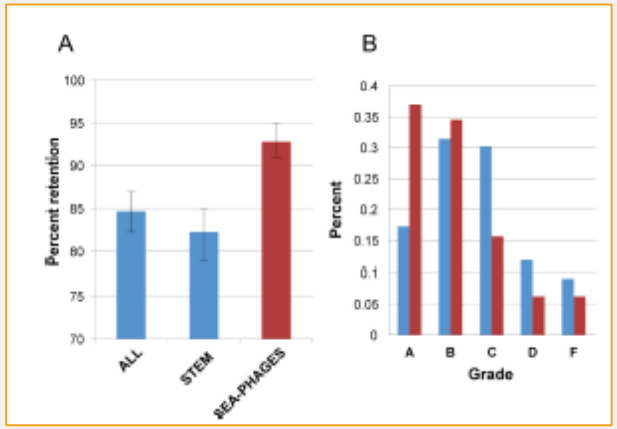
BENEFITS OF UNDERGRADUATE RESEARCH

- Understand the research process and how professionals in the field creatively work on problems
- Learn new techniques or skill sets
- Analyze and interpret data
- Apply classroom knowledge or theory to real-life scenario
- Advance your professional skills and help clarify your career path
- Develop your self-confidence
- PROMOTE YOUR ACADEMIC SUCCESS!



Raising interest. UROs often increase a student's interest in STEM careers.

Russell, *et al.* (2007). *Science*



Jordan, *et al.* (2014). *mBio*

JOLEE COHEN

LONDON ACADEMY OF MUSIC AND DRAMATIC ART

Describe your project: "*Over the summer, I studied at the London Academy of Music and Dramatic Art in London, UK, where I was introduced to classical acting and research techniques for working with and performing Shakespeare. Now, I take what I learned and hone the craft, implementing it into my own work and using it to help others."*

What has been the hardest part about your research/what was the most unexpected thing about being a researcher?: *"I've so often thought of research as something strictly for STEM, and for a larger community instead of for an individual. Part of the challenge was understanding and articulating how my research has been impactful in a personal way, and physically recording what I was learning as it was happening, since theatrical/performance research is so focused on the physical and emotional experience."*

What is your advice to other students about getting involved in research?: *"Don't be afraid to ask questions. Do what seems the scariest. Write things down. Have an open heart and an open mind. And have fun."*

CAMERON WALKUP

DORIS DUKE CONSERVATION SCHOLARS PROGRAM

Describe your project: *"Drawing from management policies at Canyon de Chelly and Bears Ears National Monuments, I proposed methods for the National Park Service and the Grand Canyon's 11 historically associated tribal nations to co-manage Grand Canyon National Park."*

What has been the most rewarding part?: *"The most rewarding part was being able to tie together distinct ideas and propose solutions to a critical issue..."*

How will you disseminate your research? *"At the end of my program I participated in a poster presentation session with the other members of my cohort. I am currently exploring opportunities to refine my research for further dissemination."*

What is your advice to other students about getting involved in research?: *"Take any opportunity you can to do research. Apply for as many programs as you can and reach out to professors on campus for opportunities here at UMBC. Even if a program or internship is not explicitly focused on research, if you take the initiative you can create a research project out of it."*

SHIRIN PARSA – BIOLOGICAL SCIENCES

UVA DEPARTMENT OF MICROBIOLOGY, IMMUNOLOGY AND CANCER BIOLOGY

Describe your project: *"Our objectives are to determine if the diurnal addition of sleep hormones has an effect on cancer cell growth and response to chemotherapeutic drugs…"*

Who is your mentor for your project? Why did you choose them?: *"My mentor is Dr. Daniel Gioeli in the UVA Department of Microbiology, Immunology, and Cancer Biology. I participated in the UVA Summer Research Internship Program (SRIP) this past summer, and I ranked Cancer Biology as my top choice for my lab in the application, which is how I was assigned to Dr. Gioeli's lab!"*

How will you disseminate your research?: *"I will be presenting my research at the Annual Biomedical Research Conference for Minority Students (ABRCMS)….and I will also plan on presenting my research at Undergraduate Research and Creative Achievement Day (URCAD) here at UMBC."*

What is your advice to other students about getting involved in research?: *"Try to find a research lab that aligns with your interests but do not be afraid to try something new, so keep an open mind. And never give up – no matter how many times it may take to get your experiment running or to see results!"*

REBEKAH KEMPSKE

DEPARTMENT OF MECHANICAL ENGINEERING

Describe your project: *"I am part of a team that is working on developing a binder for printing thermoelectric elements. These thermoelectric elements are a component of a type of flexible energy harvesting device called a thermoelectric generator."*

What has been the hardest part about your research/what was the most unexpected thing about being a researcher?: *"Even though I took Engineering Materials the semester before I began my research, there was still a great deal of information and lab techniques I did not know and needed to learn. There was a learning curve, but through reading papers and a lot of practice, I was able to quickly get up to speed and become a contributing member of the team."*

What is your advice to other students about getting involved in research?: *"Try to get involved in research as early as possible! I did not start my research experience until Spring of my Junior year, and I wish I would have started sooner. Also, do not be afraid to try something out! Even if you are not very knowledgeable about a particular subject area, you learn a lot while you are conducting research and everyone is always willing to help you."*

JORDAN TROUTMAN

RISE RESEARCH EXPERIENCE, RUTGERS UNIVERSITY

Describe your project: *"My project aimed to understand how predictive computer algorithms can impose biases across protected groups (e.g. race, gender, etc.) when it is not possible to use common measures of comparing an algorithm's predicted outcome with its intended outcome."*

What has been the most rewarding part?: *"…Since this field is very interdisciplinary, I believe it is crucial for researchers to be able to express their ideas in ways that individuals of varying fields and expertise can easily understand why their work is important. This allows for more collaboration from other academic areas as well as making the essence of research a more inclusive experience. Bringing more viewpoints on an important topic like machine learning fairness will point us in the direction of the best solution."*

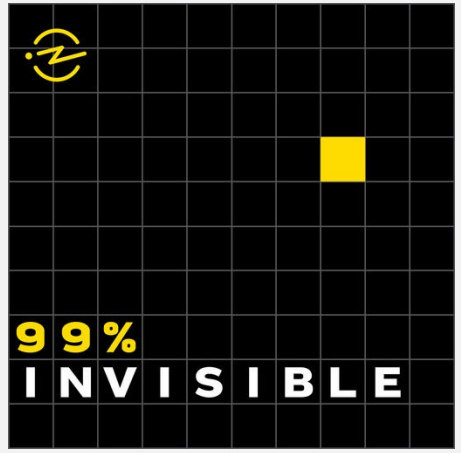
What is your advice to other students about getting involved in research?: *"For UMBC students wanting to get into research, there is no requirement to be in a scholars program or have honors achievement. Research is a simple concept that anyone can do. Anyone who has ever identified a problem and envisioned the problem being solved is a researcher at heart."*

GOALS

- Think about why you want to do research
  - Develop specific skill sets
  - Apply and expand your classroom knowledge
  - Explore career paths
  - Develop professional networks
- Be prepared to answer – research mentors will ask!

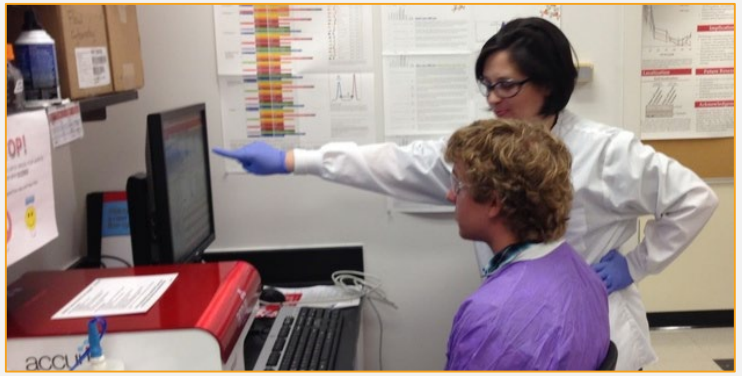
GETTING STARTED: WHAT ARE YOUR INTERESTS?

- Listen in class
- Ask faculty members and graduate students (TAs) about their research or creative work
  - Informational Interviews!
- Read textbooks or journal articles
  - Google Scholar
- Listen to podcasts!



THINK ABOUT WHAT YOU CAN OFFER

- What specific skills or knowledge have you mastered?
  - Class or lab experience
  - Employment
- How much time per week can you devote to research? When?
  - Academic year: 8-10 hours per week
  - Summer: 20-40 hours per week



FINDING OPPORTUNITIES ON CAMPUS

- Departmental web pages
- myUMBC
- Search Undergraduate Research archives - ur.umbc.edu/urcad/archive/
- Ask your friends or TAs

19

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Fall Psychology Research Experience with the Maton Lab!

Psych 397 for Research Credit

Sophomore, Juniors, and Seniors - gain Psychology research experience this Fall with the Maton Lab!

Task opportunities include quantitative data entry, qualitative research (coding interviews), participant tracking, literature search/review, data cleaning, and general office assignments.

This position is a fall semester research position with the opportunity to continue on into the spring semester.

Ideal candidates will have:
**GPA of 3.0 or higher
**excellent attention to detail
**ability to learn new tasks quickly
**commitment to completing tasks with thoroughness and good quality
** At least 3-4 hours per week to commit (based on number of credits taken, 1-3)

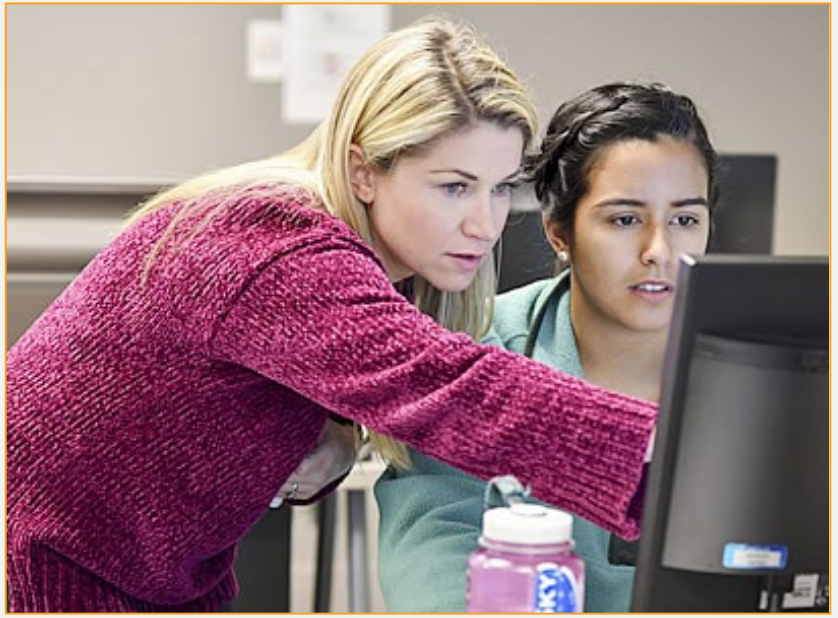
See an overview of Dr. Ken Maton's lab and research topics http://psychology.umbc.edu/people/corefaculty/maton/ Interested students should email Rukiya Moraga (wideman1@umbc.edu) **and** Ishita Arora (ishita1@umbc.edu) with:

1) Letter of Interest
2) Unofficial Transcript
3) Resume or Curriculum Vitae (not required, but given priority)

Visit Website

HOW TO SECURE THE ON-CAMPUS RESEARCH EXPERIENCE

- Be proactive – start looking 2-3 months (or perhaps an entire semester) ahead of when you would be looking to start.
- Be willing to volunteer – most faculty are unable to pay undergraduates
- Be open about your time and experience
  - Academic year: try to identify 2-3+ hour chunks of time during your week that you can devote to research. Be up front with your academic obligations…remember that you're a student first!
  - Summer/Winter: identify large chunks (perhaps 3 full days a week or more) that you can offer. Be up front with any planned vacations or academic activities.
- Speak with your academic advisor and your current professors. Get to know them and visit their office hours, as they can serve as excellent references.
- Be persistent and follow up! Faculty are busy people…



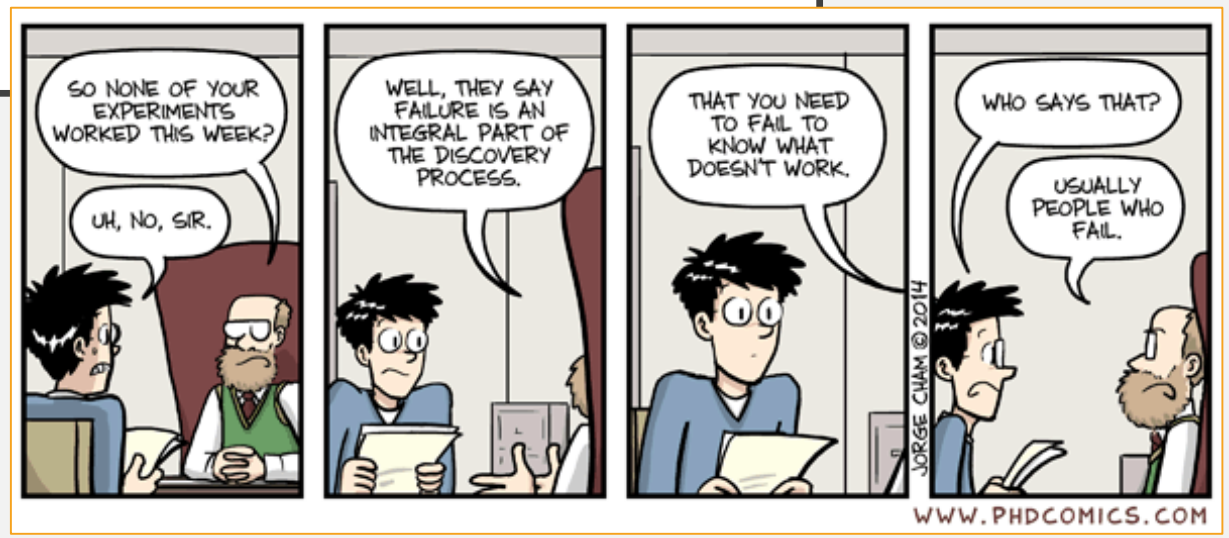
FINDING OFF-CAMPUS EXPERIENCES

- Research Experiences for Undergraduates (REUs) – host institutions
  - NSF REU website: https://www.nsf.gov/crssprgm/reu/reu_search.jsp
  - Applications typically open Nov./Dec. and close December-March
- UMBC Office of Undergraduate Research has a list of off-campus research experiences: ur.umbc.edu/summer-research
- Explore your local community
  - Art apprenticeships or museums
  - Local hospitals or research centers
  - Federal government (NIH, NASA, etc.)

HOW TO SECURE OFF-CAMPUS EXPERIENCES

- Have a strong GPA; off-campus research opportunities can be competitive. You'll have to submit your unofficial transcripts.
- Establish relationships with faculty, mentors, and academic advisors at your institution who can write you strong letters of recommendation. Typically, you will need three letters.
- Develop a well-crafted personal statement that you can update for each opportunity.
- Have your resume up-to-date and ready to go!
- Visit the Career Center for help with resumes and personal statements.

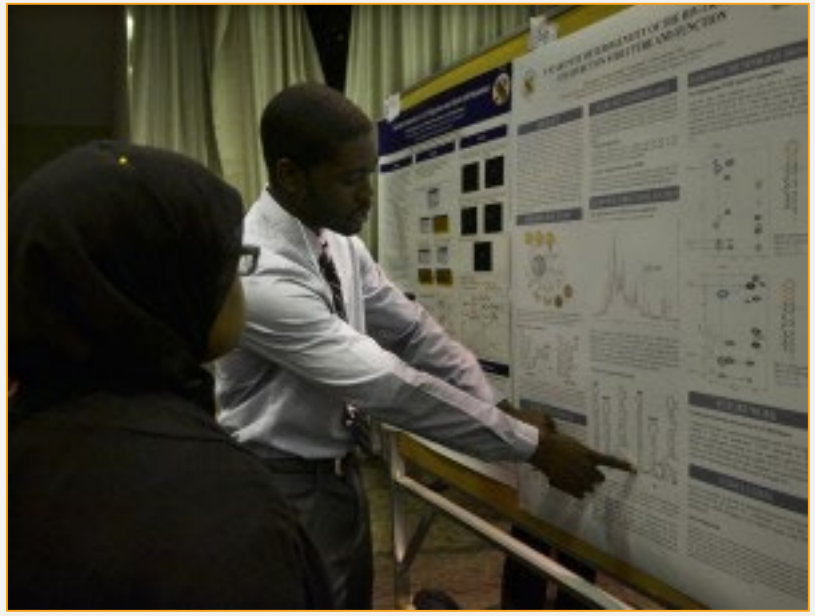
ONCE YOU START



- Take the work seriously and make it a priority.
  - Be reliable.
  - Be honest.
  - Be engaged.
- Don't be afraid to fail…failure is a normal part of research. Remember that failure is how we LEARN.
- Invest in your relationship with your mentor. Not only will they support your academic and professional goals, but they will become a strong letter of recommendation for graduate school, employment, or scholarship opportunities.

DISSEMINATE YOUR RESEARCH ON CAMPUS

- **Undergraduate Research Awards (URA)** – provides $$ to support your research. Competitive application, due May 1st.
- **Undergraduate Research and Creative Achievement Day (URCAD)** – an undergraduate research symposium held annually every spring. Great opportunity to present your work…looks great on resumes!
  - Summer Undergraduate Research Fest (every August – STEM)
  - Undergraduate Research Symposium in the Chemical and Biological Sciences (every October - STEM)
- ***UMBC Review*** – publish your research!



UNDERGRADUATE RESEARCH AWARDS

ur.umbc.edu/ura

- Research or creative work under a faculty mentor
- Up to $1,500 to support a research
- NEW! **Entrepreneurship URAs** support the development of a solution to a technical or social problem (faculty mentored)

URCAD

ur.umbc.edu/urcad

- Held annually in April – this year it will be April 22, 2020!
- Celebration of undergrad. achievement in research, scholarship, creative arts
- Oral presentations, posters, demonstrations, exhibits, performances
- May be independent, or part of faculty mentor's ongoing research

NEXT STEPS

1. Start now! Summer deadlines are approaching. Be proactive!
2. Visit the Career Center for help with preparing professional documents.
3. Develop relationships with at least three faculty members who can write strong letters of recommendation
4. Enjoy the process – research is fun!

CAMPUS RESOURCES

- UMBC Office of Undergraduate Research (ur.umbc.edu)

  Dr. April Householder: aprilh@umbc.edu

  Director of Undergraduate Research & Nationally Competitive Scholarships

- Career Center (internships@umbc.edu)

- Writing Center (lrc.umbc.edu/tutor/writing-center)

DR. LAURA OTT

Director, Science Education Research Unit

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